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The Vascular Flora of San Tan Mountains Regional Park, Pinal County, Arizona

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THE NEW YORK BOTANICAL GARDEN

The Vascular Flora of San Tan Mountains Regional Park, Pinal County, Arizona

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ABSTRACT

San Tan Mountains Regional Park encompasses 4128 hectares of typical central Arizona basin and range country and is managed within the Maricopa County park system. Located on the northeastern flank of the San Tan Mountains, it is floristically and vegetationally characteristic of the Arizona Upland subdivison of the Sonoran Desert with influences of the Lower Colorado River Valley subdivision at its low elevational borders. The annotated checklist of vascular plants presented here is comprised of 239 taxa, from 171 genera, 238 species, and 52 families. This baseline study, the first documented flora, will significantly assist in evaluating future changes within San Tan Mountains Regional Park.

INTRODUCTION

The Valley of the Sun (the Phoenix metropolitan region and outlying areas in Maricopa and Pinal Counties, Arizona) is ringed by a series of regional parks. San Tan Mountains Regional Park (STMRP), created in 1986 (Jensen 2000), is the latest such entity to be added to this regional park complex. Until recently, this park received less attention from the general public than the other parks within the county system (Brock 2000) because it was in a relatively remote part of the far southeastern Valley, surrounded by undeveloped desert, and fringed by agricultural fields. At present, this area is one of the fastest developing regions in the entire Valley. As development increases, so too will human impact on San Tan Mountains Regional Park.

Until now, there have been no published floristic studies of STMRP, and very few collections have been documented. The lack of improved roads and trails (Kuzmin & Colvin 2000) and inaccessibility of large areas of the park may have contributed to this dearth of collections. In addition to documenting the diversity of vascular plants in the park, this flora provides baseline data that precedes potential ecological consequences associated with the intensive urban development in the area and the increasing use of STMRP by the human population.

A recent floristic study of documented vascular plants from the Phoenix metropolitan core and surrounding non-urban areas indicated the need for greater collection in the southeastern part of the Valley, including the area of the STMRP

(Damrel et al. 1999). It became clear that a flora of this regional mountain park was necessary for a more complete knowledge of vascular plant diversity within central Arizona.

STUDY AREA

Area boundaries—STMRP (Fig. 1) is located on the northeastern flank of the San Tan Mountain range, a 25 km (16 mi.) long, west-northwest trending uplift (Ferguson & Skotnicki 1996), approximately 48 km (30 mi.) southeast of downtown Phoenix (Maricopa County Parks and Recreation Commission 1990). The park, located within Township 3 South and Range 7 East, covers approximately 4128 hectares (10,200 acres) and has an irregular shape, with a "north finger" and "south finger" extending eastward. To the north it is bordered by the Higley Basin which extends over the Maricopa County line and continues northward encompassing agricultural fields and housing developments connected with the nearby town of Queen Creek. The community of Chandler Heights is on the northwest border. The Gila River Indian Reservation roughly envelops the western and southern portions of the park. This reservation contains the remainder of the San Tan Mountain range, including the highest prominence, San Tan Mountain (elevation 946 m = 3104 ft.). The reservation to the south continues as a typical central Arizona basin and range landform, characterized by eroded mountains rising less than 1,000 meters (3281 ft.) above surrounding alluvial basins (Huckleberry 1994). The east and northeast boundaries abut largely unincorporated county land consisting of low-lying hills, alluvial areas, desert flats and agricultural fields. Low density housing also irregularly borders the park at several other locations, including north of Goldmine Mountain, between the north and south "fingers" on the eastern border and near Rock Peak in the south-central area.

Topography, geology, and soils—The elevation of the study site ranges from the basin floor (430 m = 1410 ft.) near the south border, to the highest peak in the park, an unnamed prominence in the Malpais Hills (774 m = 2539 ft.). More than 80% of the park is either mountainous or rough broken land. The San Tan Mountains rise abruptly from a surrounding alluvial plain. The rugged granitic Goldmine Mountains (to 751 m = 2464 ft.) dominate the northeast section of the park, and the Malpais Hills (Fig. 2C) in the south culminate in dramatic sheer cliffs (Figs. 3E-F, Maricopa County Parks and Recreation Commission 1990). These two features are separated by a broad alluvial fan (Fig. 3B). No permanent water source exists within the park. Ephemeral washes occur at the bases of mountains and in dissecting alluvial fans.

The geology of the San Tan Mountains is dominated by Proterozoic and Laramide granites that intrude older, polydeformed metamorphic rocks. Proterozoic and Cretaceous crystalline rocks are overlain in the central and eastern part of the range by Mid-Tertiary sedimentary and volcanic rocks (Ferguson & Skotnicki 1996). Most of the exposed bedrock in the area is granite and schist; rhyolitic volcanics are also exposed on the northern side of the Malpais Hills (Huckleberry 1994). There are two primary soils within the park. The rock land soils of the arid/

semi-arid mountains are characterized by granitic and schist rock outcrop and shallow, cobbly soils. The flood plain soils of low alluvial fans between Goldmine Mountain and the Malpais Hills, together with the "fingers" pointing eastward, are composed of deep medium, moderately coarse and moderately fine textured alluvial soils on 0-3% slopes (Adams 1971).

Climate—Hot summers and mild winters summarize the climate of the STMRP. Average monthly temperatures, recorded at Chandler Heights weather station just north of the San Tan Mountains, range from approximately 18.4°C (65.1°F) in January to 40°C (104°F) in July. Climate records (1948 through 2005) indicate that an annual precipitation of 227.4 mm (8.95 in.) is distributed in a bimodal weather pattern characteristic of the Sonoran Desert (Turner & Brown 1994). Nearly 57% (130 mm = 5.12 in.) of annual rainfall occurs during the warm-to-hot season spanning May to October. This generally manifests itself as dramatic summer convection storms of tropical origin reaching the mountains from the southeast. The remaining 43% of the annual precipitation (97.28 mm = 3.83 in.) falls between November and April as gentle steady rains from exhausted Pacific frontal storms, carried east by westerly winds (Western Regional Climate Center 2007; Turner & Brown 1994).

The winter-spring precipitation, accompanied by mild temperatures, contributes to a diverse flush of spring ephemerals, which comprise approximately 42% (101 taxa, Table 3) of the total flora. Yearly fluctuations in rainfall are common, however, and have dramatic effects on the presence or absence of these ephemeral populations. This study began in April of 1998, following a winter "El Niño" event. Rainfall from November 1997 through April 1998 measured 231 mm (9.81 in.) and resulted in an abundance of ephemerals (Fig. 2D). In the two following years, winter-spring precipitation (November 1998 through April 1999 and November 1999 through April 2000) measured 75 mm (2.97 in.) and 62 mm (2.45 in.), respectively (Western Regional Climate Center 2007). The spring ephemeral display was virtually non-existent during both of these periods.

History—The origin of the name "San Tan" or "Santan" is marked with inconsistency, ambiguity, and obscurity. Both names can be found in use today. The modern San Tan Mountains share the name of a Pima settlement located north of the Gila River, across from Sacaton (Barnes 1988). According to Pima historical narrative based on calendar sticks, the area surrounding the village was originally called *â-ât'kåm va-aki* – "sandy ancient house" (Granger 1983). The most accepted explanation for the origin of the name is that San Tan or Santan represents a Papago corruption of the name Santa Ana. When a group Native Americans of the Quajote rancheria moved to the north bank of the Gila, the Papagos called their new location Santa Ana, a name that early padres gave to an older deserted rancheria at the foot of Santa Rosa Mountain. In 1910, a native translator of Pima calendar sticks maintained that the village of San Tan was noted as early as 1857 (Barnes 1988). It can be assumed that usage of the name San Tan Mountains began at about the same time.

The area contains evidence of human presence thought to date back to the Classic Period of Hohokam chronology, ca. 1100-1450 A.D. Rockpile fields (also called cobble clusters, Fig. 3A) occur on large portions of the southern flanks and on

the western side of the range. They are considered a typical Hohokam archaeological feature indicating agricultural activity. The locations and structure of the rockpiles, as well as tabular knives, chipped stone, and check dams that have been found in the same region, have led archaeologists to suggest that agaves, yuccas, and chollas may have been cultivated and processed in this area (Cantley 1991).

The San Tan Mountains area was not subject to intense development during the Arizona territorial period or through early statehood. With the exception of a stagecoach trail (Fig 2E, now part of Olberg Road and "the Gap", an undeveloped trail that runs between the east side of the Malpais Hills and a prominence called "Rock Peak"), a brief period of limited cattle grazing, and the activities of a small number of prospectors, the area that is now STMRP was largely undeveloped prior to 1975 (Bale 2001, Ingram pers. comm., Picket 1996).

Perhaps the most well-known inhabitants of the San Tan Mountains were two hermit prospectors now buried at the foot of the Goldmine Mountains. In 1948, Mansel Carter and Marion Kennedy moved into a partial cave (later replaced by a palm frond-covered shanty) in the San Tan Mountains and began hunting minerals. The two used their finds of copper, silver, turquoise, and gold to establish mining claims, 55 of which are currently owned by Carter's heirs. When Kennedy died in 1960 (at the age of 86), Carter began to try his hand at whittling figurines from cactus skeletons and wood found in the San Tans. Carter's hermit-prospector lifestyle, his natural rapport with animals, and his whittled "Cactus Curios" made him a colorful local celebrity, featured on television and in *Phoenix Magazine*. Carter retired from mining at the age of 81, supporting himself solely by the sale of his carved figurines. In 1987 the "Old Man of the Mountain" died at the age of 85, having spent nearly the last forty years of his life in the San Tan Mountains (Bale 2001).

Land management and use—STMRP is comprised of land owned by two governmental agencies. The United States Bureau of Land Management owns ca. 2750 hectares (~6800 acres) that became part of the park in the 1980s. Maricopa County owns the remainder (ca. 1396 hectares = 3400 acres) which was incorporated into the park in the 1990s (Ingram 2002). At the time of its inception, those who fought to preserve desert space from development had a special challenge in the San Tans. The park sits in Pinal County, but the regional growth was in Maricopa County. For this reason, Maricopa County agreed to build and manage the park (Anonymous 2002).

Currently, STMRP is primarily utilized for recreational purposes (e.g., horseback riding and hiking). According to the Master Plan of June 2003, the park's focus is development which protects both historical and archaeological sites as well as sensitive vegetation and habitat. This includes fencing the park and closing illegal access points to historic and archaeological sites, rebuilding or rehabilitating trails and roads in scenic, sensitive or historic areas, and creating designated areas for special uses (Anderson 2003). County officials began to collect admission to the park in 2003 (Leonard 2003). A visitor center, with a paved parking lot, restrooms, and a community center was officially opened to the public in 2005 (Hughes 2005).

Vegetation—The vegetation of the STMRP area typifies Sonoran Desertscrub. Shreve's map (Shreve & Wiggins 1964) places the study area within the Arizona Upland vegetation subdivision. Brown (1994) modifies Shreve's map and extends the Lower Colorado River Valley subdivision toward the southeast encompassing the San Tan Mountains. Although the maps display different boundaries, both authors share the basic concepts and descriptions of these subdivisions.

The flora within the STMRP primarily reflects the Arizona Upland vegetation subdivision (Fig. 2F, Turner & Brown 1994). This subdivision, the wettest within the Sonoran Desertscrub biome, appears as a scrubland or woodland of leguminous trees with intervening spaces held by open layers of shrubs and perennial succulents. Its topography is mostly rough, broken land and multi-dissected sloping plains (Turner & Brown 1994), typical of the STMRP. Characteristic of Arizona Upland, the most prevalent community within STMRP is the Paloverde-Cacti-Mixed Scrub series. *Parkinsonia microphylla* and *Ambrosia deltoidea* (Fig. 2F) commonly range from the topmost ridges and slopes to the lower bajadas and dissected plains at mountain bases. Other associated taxa spanning this topography include *Carnegiea gigantea* (Fig. 2F), *Lycium berlandieri, L. exsertum, Ferocactus cylindraceus* var. *lecontei, Cylindropuntia acanthocarpa* var. *major, C. bigelovii,* and *Fouquieria splendens*. Though occasionally found on higher slopes, *Larrea tridentata* (Figs. 2F & 3B) becomes abundant or even the dominant vegetation on lower bajadas and plains. Plants common to these lower areas also include *Olneya tesota* (usually beside runnels or in drainages), *Lycium andersonii, Echinocereus engelmannii* var. *acicularis, Acacia greggii, Krameria grayi, Isocoma acradenia, Trixis californica, Cylindropuntia leptocaulis*, and *Muhlenbergia porteri.*

Major ephemeral washes at mountain bases comprise another habitat that fosters a unique community of plants within STMRP (Turner & Brown 1994). Here, *Prosopis velutina* and *Parkinsonia florida* grow almost exclusively in washes. Other trees common in this community include *Olneya tesota, Celtis pallida, Acacia greggii,* and *Parkinsonia microphylla.* Though many shrubs and cacti common to lower bajadas and plains are encountered along washes, shrubs such as *Colubrina californica, Hymenoclea salsola* (Fig. 2E), and *Ambrosia ambrosioides* were found to grow almost solely within this environment. Other species that may be found outside of wash areas, such as *Bebbia juncea* and *Baccharis sarathroides,* colonize and thrive far more abundantly in washes.

The Lower Colorado River Valley subdivision is the most arid within Sonoran Desertscrub (Turner & Brown 1994). Plains and low bajadas dominate most of its surface, and its vegetation gives the impression of being simple in composition, uniformly spread over wide expanses (Shreve & Wiggins 1964). Several areas proximal to the park fit this description. Remnant desert patches within the cultivated/developed Higley Basin area to the north, and the low-lying hills and flats to the east and northeast, display widely spaced patterns of vegetation coverage and species uniformity that are indicative of Lower Colorado River Valley communities. Influences of this subdivision within STMRP generally occur at the lower elevational fringes of the park's boundaries and are most noticeable in the upper northwest corner and along the borders of the two "fingers" running eastward.

Vegetation spacing here tends to be sparser, though shrub communities still have a mixture of *Lycium* spp., *Parkinsonia microphylla, Trixis californica, Sphaeralcea* spp. (Fig. 2B), and cacti. Neither of the two major series within the Lower Colorado River Valley subdivision, Creosote-White Bursage (*Larrea tridentata–Ambrosia dumosa*) or Saltbush (*Atriplex polycarpa* and/or *A. canescens*), occurs within the park; however, small patches of *Ambrosia dumosa* can be found in these low-lying fringe areas.

Fires within the park have also shaped vegetation communities. In 1992, a fire started by children playing near the old miners' shack burned a large portion of land on the north-northwest side of Goldmine Mountain (Township 3, Range 7, Sections 8 and 9). In 1994, an arsonist started several fires in one day – burning the mountain slopes just north of the Malpais Hills (Township 3, Range 7, Sections 18 and 19), an area on east Goldmine Mountain (Township 3, Range 7, Section 10), and reburning areas burned in 1992 (Ingram 2002). Some of these areas (particularly the lower west slopes and drainages of Goldmine Mountain and the hills north of the Malpais Hills) are now colonized by communities composed nearly entirely of *Encelia farinosa* (Fig. 3C); however, the charred remains of pre-fire vegetation are still visible throughout the area (Fig. 3D). In a post-fire study of western Sonoran desert in California, *Encelia farinosa* established the most seedlings at the first growth season post-burn as well as in subsequent growing seasons. Within five years of the study, it exclusively dominated the entire burned area (Brown & Minnich 1986). Though not a particularly long-lived species, Shreve found that a single population of *Encelia farinosa* persisted for 30 years (Shreve & Hinkley 1937). Thus, these colonizing *Encelia* communities within STMRP could prevail for decades.

METHODS

Damrel et al. (1999) conducted a complete search of all Arizona specimens housed in the herbaria of Arizona State University (ASU) and the Desert Botanical Garden (DES). Thirty-seven specimens were found previously collected from the STMRP region or areas adjacent to the park; the earliest collection having been made in 1952 by John Holmes. The majority were collected in the 1960s by three collectors – Donald J. Pinkava, Elinor Lehto, and Fonda Fear. Marc Mittleman collected six specimens in 1982 and Robert Johnson made one collection in 1990. Two specimens were collected by Alejandrina Mejia in 1999 on a trip accompanying the author. Three plants within these previous collections were not recollected during the study – *Gaillardia arizonica, Pectocarya heterocarpa*, and *Cucurbita digitata* – all collected by Lehto in 1962.

The author collected 406 specimens from April 1998 to July 2004. During this period, 46 collection trips were made with care to collect in different seasons. An effort was made to collect from distinct representative areas throughout the park in different slopes, aspects, and elevations. Taxa from areas adjacent to the park boundaries were included due to their proximity to the study site as well as common habitats. It is very likely that these taxa exist within the park at present or will be

found there in the future. Specimens excluded from this flora, though collected within one kilometer from the park's boundary include *Castella emoryi* (*DZD 520*), located in a habitat not found within the park, and *Opuntia gosseliniana* (*DZD 2629*), suspected to have been planted at the edge of private land adjacent the park. Voucher specimens were deposited at Arizona State University Herbarium (ASU) in Tempe, Arizona, and the herbarium at Desert Botanical Garden (DES) in Phoenix, Arizona. An additional set of voucher specimens was collected for deposition with the Maricopa County Regional Park Superintendent, Bob Ingram.

Most plants were identified using *Arizona Flora* (Kearney et al. 1960). The author also utilized newer taxonomic treatments from the Vascular Plants of Arizona Project found in the *Journal of Arizona-Nevada Academy of Science.* Additionally, certain taxa were identified by various experts, who are cited in the acknowledgments. Nomenclature authority of most taxa is based on the Synthesis of the North American Flora (Kartesz & Meacham 1999), with author names and abbreviations following those used by the IPNI (International Plant Names Index 2004). Occasionally, nomenclature exceptions are made of those specimens noted by the experts.

Taxa are listed according to divisions: Lycopodiophyta (club-mosses), Polypodiophyta (ferns), Pinophyta (gymnosperms), Magnoliophyta—Magnoliopsida (dicotyledons), and Magnoliophyta—Liliopsida (monocotyledons) following Cronquist et al. (1966). Each entry features the scientific name followed, when appropriate, by important synonyms and common names. Plant origins follow, represented by the symbols N and I (native or introduced). Sequentially, plant life forms are assigned the following symbols: T = tree, woody plants, usually with a central trunk and the potential to grow to 5 meters tall; SH = shrub/subshrub, plants branching at the base that are woody or have woody caudices; SU = stem succulent, perennial and includes all cacti; P = perennial, wholly herbaceous plants with potential for more than one growing season (includes "bulbs" as well as parasitic plants within STMRP); WSE = winter/spring ephemeral, herbs whose lifecycle occurs within one season following the winter rains; and SFE = summer/fall ephemerals, herbs whose lifecycle occurs within one season following the summer monsoon (this category includes ephemerals that bloom sporadically throughout the year). Relative abundance, a subjective judgment based upon personal observation, is assigned from within three estimations: "common" = many individuals throughout a sample site; "occasional" = several individuals within a sample area; and "rare" = one or only a few plants observed. Each vouchered collection has a number preceded by abbreviations of the collector. The majority of vouchers are collections of the author (*DZD*). The following collectors contributed the remainder of the specimens: Fonda Fear (*FF*), Robert Johnson (*RJ*), Elinor Lehto (*EL*), Alejandrina Mejia (*AM*), Marc Mittleman (*MM*), and Donald J. Pinkava (*DJP*).

RESULTS AND DISCUSSION

The flora of the STMRP consists of 239 taxa within 52 families, 171 genera, 238 species (with one distinction being made at the infraspecific level).

Approximately 90% of the species, such as *Crossosoma bigelovii* (Fig. 2A), *Larrea tridentata*, and *Parkinsonia microphylla*, are indigenous. Tables 1-3 summarize the flora by major taxonomic categories, the five most represented families, and categories of life form, respectively. The vascular plant families found within STMRP that are represented by the highest number of species include: Asteraceae (42), Poaceae (25 species and 2 varieties of *Aristida purpurea*), Fabaceae (17), Boraginaceae (14), and Cactaceae (13). Together these families account for nearly 47% of the species reported in this flora. Over 46% of the families included in the study are represented by a single species only. The genera represented by highest number of species are *Cryptantha*, *Cylindropuntia*, and *Eriogonum* (5 each); *Pectocarya, Chamaecyse, Lotus, Camissonia*, and *Lycium* (4 each); *Ambrosia, Chenopodium, Lupinus, Sphaeralcea,* and *Linanthus* (3 each).

Twenty-four introduced species account for 10% of the STMRP flora. Over half of the flora's Poaceae taxa (55%) are introductions. This family is the major contributor, with 46% (11 taxa) of the non-native total. Asteraceae and Brassicaceae, each with three exotics, together comprise 24% of total introductions. Chenopodiaceae includes two non-native taxa (8%). The six remaining exotics are all of different families. A majority of the 21 non-native species (87%) are ephemeral, 66% (14 taxa) of which occur primarily in the spring. Only two exotic taxa (8%) are perennial herbs. Both are African grasses (*Cynodon dactylon* and *Pennisetum ciliare)* that are common adventives throughout the Valley. Stem succulents are represented by a single taxon. This lone prickly-pear, *Opuntia microdasys,* was probably introduced to the park as discarded landscape material. It persisted for approximately two years, after which the author was unable to locate it. No exotic shrubs/subshrubs or trees were documented within the flora.

Although the percentage of introductions within STMRP is somewhat higher than the 7% recorded statewide in the *Arizona Flora* (Kearney et al. 1960), it is comparable to some floras from areas in close proximity to urban interface and agricultural activity in the southern part of the Valley. Studies of Phoenix South Mountain Park (Daniel & Butterwick 1992) and Sierra Estrella Mountains Regional Park (Sundell 1974) reported 10% and 11% introductions, respectively. However, this is not always the case, as evidenced by floras of other parks encroached by urban sprawl/agricultural impact. White Tank Mountains Regional Park, in the west Valley, contains 6.7% exotics (Keil 1973) and McDowell Mountain Regional Park, to the east, lists 8% introduced species (Lane 1981), percentages comparable to those described by Kearny et al. (1960). The above mentioned parks have buffer zones of undeveloped land on part of their boundaries. Papago Park Military Reservation, completely surrounded by the Phoenix metropolitan area, has a flora consisting of 13% non-native plants (Walters 2002).

This study adds no new or threatened/endangered taxa to the state's flora. It does document a disjunct population worthy of note. *Colubrina californica* (Las Animas Nakedwood) has only been collected in one location in Pinal County, the San Tan Mountains area. This population lies on an imaginary west-southwest line halfway between populations near Canyon Lake and the Sand Tank Mountains in Maricopa County. Only three other *C. californica* specimens, all housed at the University of Arizona Herbarium (ARIZ), had been collected from the San Tan

Mountains prior to this study: two by G. J. Harrison in 1930 (*7076*, *7377A*) and one by R. H. Peebles in 1931 (*7911*). Though generally noted as growing on rocky or gravellyslopes (Turner et al. 1995), in STMRP this species is mostly encountered in sandy washes, often flowering in the middle of summer.

Table 1. Summary of the flora of the San Tan Mountain Regional Park by major taxonomic categories (*includes two varieties of *Aristida purpurea*).

Taxonomic Group	Families	Genera	Species
Lycopodiophyta	1	1	1
Polypodiophyta	1	4	5
Pinophyta	1	1	1
Magnoliophyta-Magnoliopsida	47	144	205*
Liliopsida	2	21	27
Totals	**52**	**171**	**239**

Table 2. The five largest families in San Tan Mountain Regional Park by number of genera, species and percentage of the total flora (*includes two varieties of *Aristida purpurea*).

Family	Genera	Species	Percent of Total Flora
Asteraceae	35	42	17.6%
Poaceae	20	26*	10.9%
Fabaceae	10	17	7.1%
Boraginaceae	6	14	5.9%
Cactaceae	6	13	5.4%
Totals	**77**	**171**	**46.9%**

Table 3. Summary of vegetation life forms in San Tan Mountain Regional Park (*includes two varieties of *Aristida purpurea*).

Life Form	Species	Percent of Total Flora
Tree	6	2.5%
Shrub/Subshrub	46	19.2%
Stem Succulent	13	5.4%
Perennial Herb	39*	16.3%
Winter-Spring Ephemeral	101	42.3%
Summer-Fall/Sporadically Blooming Ephemeral	34	14.3%
Totals	**239**	**100%**

CATALOGUE OF VASCULAR PLANTS OF THE SAN TAN MOUNTAINS REGIONAL PARK, PINAL COUNTY, ARIZONA

LYCOPODIOPHYTA (CLUB-MOSSES)

Selaginellaceae

Selaginella arizonica Maxon. Resurrection Fern. N, P; occasional to common on rocky north or sheltered slopes. *DZD 1191, 1817B.*

POLYPODIOPHYTA (FERNS)

Pteridaceae

Astrolepis sinuata (Lag. ex Sw.) D.M. Benham & Windham ssp. *sinuata.* [*Notholaena sinuata* (Lag. ex Sw.) Kaulfuss; *Cheianthes sinuata* (Lag. ex Sw.) Domin]. Wavy Cloak Fern. N, P; rare on rocky north-facing slopes. *DZD 1693B.*

Astrolepis cochisensis (Goodd.) D.M. Benham & Windham. [*Notholaena cochisensis* Goodd.]. Cochise Scaly Cloak Fern. N, P; occasional on rocky crevices and north-facing slopes. *DZD 1193.*

Cheilanthes parryi Domin. [*Notholaena parryi* D.C. Eaton]. Parry's Lip Fern. N, P; locally occasional to rare among sheltered rock outcrops. *DZD 1192.*

Notholaena standleyi Maxon. [*Cheilanthes standleyi* (Maxon) Mickel]. Star Cloak Fern. N, P; rare to occasional among sheltered rock outcrops. *DZD 2042, 2099.*

Pellaea truncata Goodd. [*Pellaea longimucronata* auct. non Hook.]. Spiny Cliff Brake Fern. N, P; rare among sheltered rock outcrops. *DZD 1694B.*

PINOPHYTA (GYMNOSPERMS)

Ephedraceae

Ephedra fasciculata A. Nelson. Mormon Tea, Joint-fir. N, SH; occasional to locally common. *DZD 562.*

MAGNOLIOPHYTA (ANGIOSPERMS)

MAGNOLIOPSIDA (DICOTYLEDONS)

Acanthaceae

Carlowrightia arizonica A. Gray. Arizona Wrightwort. N, SH; rare to occasional along washes. *DZD 607.*

Aizoaceae

Trianthema portulacastrum L. Horse Purslane. N, SFE; rare in disturbed sandy areas. *DZD 2463.*

Amaranthaceae

Amaranthus fimbriatus (Torr.) Benth. ex S. Watson. Fringed Amaranth. N, SFE; locally occasional. *DZD 2543.*

Amaranthus palmeri S. Watson. Carelessweed. N, SFE; rare in disturbed areas. *DZD 2469, 2563.*

Tidestromia lanuginosa (Nutt.) Standl. Woolly Tidestromia. N, SFE; occasional to locally common in washes and plains. *DZD 613, 825.*

Apiaceae

Bowlesia incana Ruiz & Pav. Hairy Bowlesia. N, WSE; occasional in shaded spots. *DZD 383, 1884B; DJP 2427.*

Daucus pusillus Michx. Wild Carrot. N, WSE; occasional. *DZD 295, 378.*

Asclepiadaceae

Asclepias subulata Decne. Desert Milkweed, Rush Milkweed. N, P; rare to locally occasional. *DZD 1209B, 1364B.*

Cynanchum arizonicum (A. Gray) Shinners. [*Metastelma arizonicum* A. Gray]. Arizona Swallow-Wort. N, P; rare. *DZD 1698B.*

Funastrum cynanchoides (Decne.) Schltr. ssp. *heterophyllum* (Engelm. ex Torr.) Kartesz. [*Sarcostemma cynanchoides* Decne. var. *hartwegii* (Vail) Shinners; *Funastrum heterophyllum* (Engelm. ex Torr.) Standl.]. Hartweg's Twinevine. N, P; locally occasional within wash vegetation. *DZD 569, 2557; EL 457.*

Asteraceae

Acourtia wrightii (A. Gray) Reveal & R.M. King. [*Perezia wrightii* A. Gray]. Brownfoot. N, P; rare in drainages. *DZD 1684B, 1789B; MM 6.*

Adenophyllum porophylloides (A. Gray) Strother. [*Dyssodia porophylloides* A. Gray]. San Felipe Dogweed. N, SH; occasional. *DZD 485.*

Ambrosia ambrosioides (Cav.) W.W. Payne. [*Franseria ambrosioides* Cav.]. Canyon Ragweed. N, SH; rare to occasional in washes. *DZD 567.*

Ambrosia deltoidea (Torr.) W.W. Payne. [*Franseria deltoidea* Torr.]. Triangle-Leaf Bursage. N, SH; common. *DZD 249, 388; FF s.n.*

Ambrosia dumosa (A. Gray) W.W. Payne. [*Franseria dumosa* A. Gray]. White Bursage, White Burrobush. N, SH; rare to locally occasional. *DZD 503, 2559.*

Antheropeas lanosum (A. Gray) Rydb. [*Eriophyllum lanosum* (A. Gray) A. Gray]. White Easter-Bonnets. N, WSE; occasional on plains and flats. *DZD s.n., 242.*

Baccharis sarothroides A. Gray. Desert Broom. N, SH; occasional on roadsides to common in washes. *DZD 1009, 2048.*

Baileya multiradiata Harv. & A. Gray ex A. Gray. Desert Marigold. N, P; occasional usually on roadsides, plains and washes. *DZD 414, 574, 1369B.*

Baileya pleniradiata Harv. & A. Gray ex A. Gray. Woolly Desert Marigold. N, P; occasional along roadsides. *DZD 2038, 2564.*

Bebbia juncea (Benth.) Greene var. *aspera* Greene. Sweetbush, Chuckwalla's Delight. N, SH; occasional to locally common in washes. *DZD 615, 980.*

Brickellia coulteri A. Gray. Coulter's Brickellbush. N, SH; occasional. *DZD 392, 492, 572.*

Calycoseris wrightii A. Gray. White Tackstem. N, WSE; rare. *DZD 444.*

Chaenactis carphoclinia A. Gray. Pebble Pincushion. N, WSE; occasional on flats and desert pavement. *DZD 1578B.*

Chaenactis stevioides Hook. & Arn. Steve's Dustymaiden. N, WSE; locally occasional. *DZD 409.*

Conyza canadensis (L.) Cronq. [*Erigeron canadensis* L.]. Canadian Horseweed. N, WSE; rare in disturbed area. *DZD 1724B.*

Dicoria canescens A. Gray. Desert Twinbugs. N, SFE; rare on sandy roadsides. *DZD 1983B.*

Encelia farinosa A. Gray ex Torr. Brittlebush. N, SH; occasional to common. *DZD 390, 2032; FF s.n.*

Filago arizonica A. Gray. Arizona Cottonrose. N, WSE; rare to locally occasional. *DZD 243.*

Filago californica Nutt. California Cottonrose. N, WSE; occasional. *DZD 419, 680B.*

Gaillardia arizonica A. Gray. Arizona Blanketflower. N, WSE; apparently rare (not recollected during this study). *EL 456.*

Gymnosperma glutinosum Less. [*Selloa glutinosa* Spreng.]. Tatalencho, Gumhead. N, SH; locally occasional. *DZD 1267B, 2527; MM 7.*

Helianthus annuus L. Sunflower. N, SFE (sporadic); rare. *DZD 2484.*

Heterotheca subaxillaris (Lam.) Britton & Rusby. [*Heterotheca psammophila* B.Wagenkn.]. Camphorweed. N, SFE (sporadic); occasional in sandy, disturbed habitats. *DZD 981.*

Hymenoclea salsola Torr. & A. Gray ex A. Gray var. *pentalepis* (Rydb.) L.D. Benson. [*Hymenoclea pentalepis* Rydb.]. Burrobush, Cheesebush. N, SH; locally occasional to common in sandy washes. *DZD 278, 491.*

Isocoma acradenia (Greene) Greene. [*Haplopappus acradenius* (Greene) S.F. Blake]. Alkali Jimmyweed. N, SH; locally occasional to common on disturbed desert flats. *DZD 978, 1010, 2048.*

Isocoma tenuisecta Greene. [*Haplopappus tenuisectus* (Greene) S.F. Blake] appr. *Isocoma acradenia* (Greene) Greene. Burroweed. N, SH; rare on sandy flats. *DZD 979.*

Lactuca serriola L. [*Lactuca scariola* L.]. Prickly Lettuce. I, SFE; occasional at roadsides. *DZD 663.*

Lasthenia californica DC. ex Lindl. [*Baeria chrysostoma* Fisch. & C.A. Mey.]. California Goldfields. N, WSE; rare. *DZD 275A.*

Malacothrix glabrata (A. Gray ex D.C. Eaton) A.Gray. Smooth Desert Dandelion. N, WSE; locally occasional on low, sandy slopes. *DZD 1618B.*

Monoptilon bellioides (A. Gray) H.M.Hall. Mojave Desertstar. N, WSE; occasional on flats and desert pavement. *DZD 463.*

Pectis papposa Harv. & A. Gray. Chinchweed. N, SFE; rare on sandy, flat areas. *DZD 2514.*

Perityle emoryi Torr. Rock Daisy. N, WSE; locally occasional on rocky sheltered areas within outcrops and washes. *DZD 313, 382.*

Porophyllum gracile Benth. Odora. N, SH; occasional. *DZD 275, 2515.*

Rafinesquia neomexicana A. Gray. Desert Chicory. N, WSE; occasional. *DZD 451, 487, 1568B.*

Senecio lemmonii A. Gray. Lemmon's Ragwort. N, P; rare. *DZD 1620B.*

Sonchus asper (L.) Hill. Sowthistle. I, WSE; rare. *DZD 319.*

Sonchus oleraceus L. Common Sowthistle. I, WSE; occasional on disturbed roadsides. *DZD 1629B, 374.*

Stephanomeria pauciflora (Torr.) A. Nelson. Brownplume Wirelettuce. N, SH; occasional to locally common. *DZD 575, 1039.*

Stylocline micropoides A. Gray. Woollyhead Neststraw. N, WSE; occasional to locally common. *DZD 421, 450, 565, 1631B, 1882B.*

Trixis californica Kellogg. Trixis. N, SH; occasional. *DZD 312, 606; MM 1.*

Uropappus lindleyi (DC.) Nutt. [*Microseris lindleyi* (DC.) A. Gray, *Microseris linearifolia* (Nutt.) Sch. Bip.]. Silver Puffs. N, WSE; occasional. *DZD 563, 1576B.*

Verbesina encelioides (Cav.) Benth. & Hook. f. ex A. Gray ssp. *exauriculata* (B.L. Rob. & Greenm.) J.R. Coleman. Golden Crownbeard. N, SFE (sporadic); rare in disturbed, sandy areas. DZD 1012.

Boraginaceae

Amsinckia menziesii (Lehm.) A. Nelson & J.F. Macbr. var. *intermedia* (Fisch. & C.A. Mey.) Ganders. [*Amsinckia intermedia* Fisch. & C.A. Mey.]. Common Fiddleneck. N, WSE; common. *DZD 255; DJP 2429.*

Amsinckia tessellata A. Gray. Bristly Fiddleneck. N, WSE; rare to occasional. *DZD 372; FF s.n.*

Cryptantha angustifolia (Torr.) Greene. Panamint Cryptantha. N, WSE; occasional to locally common, especially in washes and sandy drainages. *DZD 456, 1622B.*

Cryptantha barbigera (A. Gray) Greene. Bearded Cryptantha. N, WSE; common in washes and sandy areas. *DZD 287, 302, 453, 568, 1878B; EL 451.*

Cryptantha decipiens (M.E. Jones) A. Heller. Gravelbar Cryptantha. N, WSE; rare to locally occasional. *DZD 454.*

Cryptantha maritima (Greene) Greene var. *pilosa* I.M. Johnst. Guadalupe Cryptantha. N, WSE; locally occasional. *DZD 290.*

Cryptantha pterocarya (Torr.) Greene. Wingnut Cryptantha. N, WSE; occasional. *DZD 1623B; FF s.n.*

Harpagonella palmeri A. Gray var. *arizonica* I.M. Johnst. Arizona Grapplinghook. N, WSE; locally occasional. *DZD 1618B.*

Heliotropium curassavicum L. Salt Heliotrope, Chinese Pusley, Quail-plant. N, SFE (sporadic); rare in disturbed areas. *DZD 1984B.*

Pectocarya heterocarpa (I.M. Johnst.) I.M. Johnst. Chuckwalla Combseed. N, WSE; apparently rare, possibly overlooked. *EL 450-b.*

Pectocarya platycarpa (Munz & I.M. Johnst.) Munz & I.M. Johnst. Broad-Nutted Comb Bur. N, WSE; common. *DZD 246, 299.*

Pectocarya recurvata I.M. Johnst. Arch-Nutted Comb Bur. N, WSE; common. *DZD 256.*

Pectocarya setosa A. Gray. Moth Combseed. N, WSE; rare. *DZD 458.*

Plagiobothrys arizonicus (A. Gray) Greene ex A. Gray. Bloodweed, Popcornflower. N, WSE; occasional. *DZD 279, 422A; EL 449.*

Brassicaceae

Brassica tournefortii Gouan. Asian Mustard. I, WSE; occasional. *DZD 307, 2039.*

Caulanthus lasiophyllus (Hook. & Arn.) Payson. [*Guillenia lasiophylla* (Hook. & Arn.) Greene]. California Mustard. N, WSE; occasional. *DZD 1562B, 1883B; DJP 2424.*

Descurainia pinnata (Walter) Britton. Tansy Mustard. N, WSE; oceasional to locally common. *DZD 303, 375, 1584B.*

Draba cuneifolia Nutt. ex Torr. & A. Gray var. *integrifolia* S. Watson. Wedgeleaf Draba. N, WSE; occasional. *DZD 1561B, 1603B.*

Lepidium lasiocarpum Nutt. Pepperweed. N, WSE; occasional to common. *DZD 373; FF s.n.*

Physaria tenella (A. Nelson) O'Kane & Al-Shebaz. [*Lesquerella tenella* A. Nelson]. Moapa Bladderpod. N, WSE; common. *DZD 281, 442; FF s.n.; DJP 2426.*

Sinapis arvensis L. [*Brassica kaber* (DC.) L.C. Wheeler]. Charlock Mustard. I, WSE; rare. *DZD 397.*

Sisymbrium irio L. London Rocket. I, WSE; occasional to locally common. *DZD 318, 1880B.*

Streptanthus carinatus C. Wright ex A. Gray ssp. *arizonicus* (S. Watson) Kruekeb., Rodman & Worth. [*Streptanthus arizonicus* S. Watson]. Twistflower. N, WSE; rare in washes. *DZD 504.*

Thysanocarpus curvipes Hook. [*Thysanocarpus amplectens* Greene]. Lace Pod. N, WSE; occasional. *DZD 291, 1575B.*

Cactaceae

Carnegia gigantea (Engelm.) Britton & Rose. [*Cereus giganteus* Engelm.]. Saguaro. N, SU; occasional to common. *DZD 603.*

Cylindropuntia acanthocarpa (Engelm. & J.M. Bigelow) F.M. Knuth var. *major* (Engelm. & J.M. Bigelow) L.D. Benson. [*Opuntia acanthocarpa* Englem. & J.M. Bigelow var. *major* (Engelm. & J.M. Bigelow) L.D. Benson]. Buckhorn Cholla. N, SU; occasional to common. *DZD 496, 498.*

Cylindropuntia arbuscula (Engelm.) F.M. Knuth. [*Opuntia arbscula* Englem.]. Pencil Cholla. N, SU; rare to locally occasional. *DZD 897.*

Cylindropuntia bigelovii (Engelm.) F.M. Knuth var. *bigelovii.* [*Opuntia bigelovii* Engelm. var. *bigelovii*]. Teddybear Cholla. N, SU; occasional to locally common. *DZD 508.*

Cylindropuntia fulgida (Engelm.) F.M. Knuth var. *fulgida.* [*Opuntia fulgida* Engelm. var. *fulgida*]. Chainfruit Cholla. N, SU; locally common. *DZD 662, 970.*

Cylindropuntia leptocaulis (DC.) F.M. Knuth. [*Opuntia leptocaulis* DC.]. Desert Christmas Cholla. N, SU; occasional. *DZD 657.*

Echinocereus engelmannii (Parry ex Engelm.) Lem. var. *acicularis* L.D. Benson. Engelmann Hedgehog Cactus. N, SU; occasional to common. *DZD 273.*

Ferocactus cylindraceus (Engelm.) Orcutt var. *lecontei* (Engelm.) Bravo. [*Ferocactus acanthodes* (Lem.) Britton & Rose var. *lecontei* (Engelm.) Lindsay]. Barrel Cactus. N, SU; occasional to common. *DZD 659, 1575BB; FF s.n.*

Ferocactus wislizeni (Engelm.) Britton & Rose. Candy Barrel Cactus. N, SU; rare. *DZD 2406, 2462.*

Mammillaria grahamii Engelm. var. *grahamii.* [*Mammillaria microcarpa* Engelm.]. Arizona Pincushion Cactus. N, SU; occasional. *DZD 2069.*

Opuntia microdasys (Lehm.) Pfeiff. Bunny Ears Prickly Pear. I, SU; rare. *DZD 1190.*

Opuntia engelmannii Salm-Dyck. Engelmann's Prickly-pear. N, SU; occasional (may intergrade with *Opuntia phaeacantha* Engelm.). *DZD 1366B.*

Opuntia phaeacantha Engelm. Brown-Spined Prickly Pear. N, SU; occasional (may intergrade with *Opuntia engelmannii* Salm-Dyck). *DZD 611, 1365B.*

Campanulaceae

Nemacladus glanduliferus Jeps. var. *orientalis* McVaugh. Threadplant. N, WSE; occasional. *DZD 415, 462.*

Cannabaceae

Cannabis sativa L. Hemp, Marijuana. I, WSE; rare in disturbed, compacted soil. *DZD 422, 558.*

Caryophyllaceae

Herniaria hirsuta L. ssp. *cinerea* (DC.) Cout. [*Herniaria cinerea* DC.]. Rupturewort. I, WSE; locally occasional in disturbed, sandy areas. *DZD 467.*

Loeflingia squarrosa Nutt. Spreading Pygmyleaf. N, WSE; rare. *DZD 1681B.*

Silene antirrhina L. Sleepy Catchfly. N, WSE; occasional to locally common. *DZD 471.*

Chenopodiaceae

Atriplex canescens (Pursh) Nutt. Winged Saltbush. N, SH; rare. *DZD 1734B.*

Atriplex elegans (Moq.) D. Dietr. Whitescale Saltbush. N, SFE; occasional on disturbed, sandy areas. *DZD 612.*

Chenopodium berlandieri Moq. var. *zschackii* (Murr) Murr ex Aschers. Zschack's Goosefoot. N, SFE; occasional. *DZD 767, 972.*

Chenopodium murale L. Nettleleaf Goosefoot. I, SFE (sporadic); occasional. *DZD 403.*

Chenopodium pratericola Rydb. Narrowleaf Goosefoot. N, SFE; locally occasional. *DZD 826.*

Salsola tragus L. [*Salsola iberica* Sennen & Pau, *Salsola kali* L. ssp. *tragus* L.]. Russian Thistle, Tumbleweed. I, SFE; occasional in disturbed areas. *DZD 579, 761.*

Crassulaceae

Crassula connata (Ruiz & Pav.) A. Berger var. *connata.* [*Crassula erecta* (Hook. & Arn.) A. Berger, *Tillaea erecta* Hook. & Arn.]. Sand Pygmyweed. N, WSE; occasional to locally common. *DZD 1567B, 1630B, 1876B; DJP 2433.*

Crossosomataceae

Crossosoma bigelovii S. Watson. Desert Mock Orange, Rhyolite Bush. N, SH; rare on north-facing slopes. *DZD 1683B, 1700B.*

Cucurbitaceae

Cucurbita digitata A. Gray. Fingerleaf Gourd. N, P; apparently rare (not recollected during this study). *EL 462.*

Euphorbiaceae

Argythamnia lanceolata (Benth.) Müll. Arg. [*Ditaxis lanceolata* (Benth.) Pax & K. Hoffmann]. Narrowleaf Silverbush. N, SH; occasional. *DZD 285, 975; MM 2.*

Argythamnia neomexicana Müll. Arg. [*Ditaxis neomexicana* (Müll. Arg.) A. Heller]. New Mexico Silverbush. N, P; locally occasional. *DZD 608, 1030, 2100; RJ 12.*

Chamaesyce capitellata (Engelm.) Millsp. [*Euphorbia capitellata* Engelm.]. Head Sandmat. N, P; locally occasional. *DZD 2382.*

Chamaesyce micromera (Boiss. ex Engelm.) Wooton & Standl. [*Euphorbia micromera* Boiss. ex Engelm.]. Sonoran Sandmat. N, SFE; locally occasional. *DZD 2530.*

Chamaesyce polycarpa (Millsp.) Benth. ex Parish. [*Euphorbia polycarpa* Benth.]. Smallseed Sandmat. N, P; common. *DZD 771, 901, 971, 984, 2415; AM 140; EL 453.*

Chamaesyce setiloba (Engelm. ex Torr.) Millsp. ex Parish. [*Euphorbia setiloba* Engelm. ex Torr.]. Yuma Sandmat. N, SFE; rare to occasional in washes. *DZD 2532.*

Euphorbia eriantha Benth. Desert Pointsettia. N, P; locally occasional. *DZD 2101, 2480, 2520.*

Fabaceae

Acacia greggii A. Gray. Catclaw Acacia. N, T; occasional. *DZD 483, 666, 898.*

Astragalus didymocarpus Hook. & Arn. var. *dispermus* (A. Gray) Jeps. Dwarf White Milkvetch. N, WSE; rare. *DZD 458.*

Astragalus nuttallianus DC. Nuttall Locoweed. N, WSE; locally occasional. *DZD 240, 494.*

Calliandra eriophylla Benth. Desert Fairyduster. N, S; rare. *DZD 1368B.*

Dalea mollis Benth. Silky Dalea. N, P; occasional. *DZD 500, 1790B.*

Lotus humistratus Greene. Foothills Deervetch. N, WSE; occasional. *DZD 407; DJP 2420.*

Lotus rigidus (Benth.) Greene. Shrubby Deervetch. N, SH; rare to loeally occasional. *DZD 1573B.*

Lotus salsuginosus Greene var. *brevivexillus* Ottley. Coastal Bird's-foot trefoil. N, WSE; locally common. *DZD 252, 1605B; DJP 2420; FF s.n.*

Lotus strigosus (Nutt.) Greene var. *tomentellus* (Greene) Isley. [*Lotus tomentellus* Greene]. Hairy Lotus. N, WSE; occasional to locally common. *DZD 321, 1604B.*

Lupinus arizonicus (S. Watson) S. Watson. Arizona Lupine. N, WSE; occasional. *DZD 292, 400.*

Lupinus concinnus J. Agardh ssp. *orcuttii* (S. Watson) D.B. Dunn. Orcutt's Lupine. N, WSE; rare to locally occasional. *DZD 480, 1632B.*

Lupinus sparsiflorus Benth. ssp. *mohavensis* Dziek. & D.B. Dunn. Mojave Lupine. N, WSE; occasional to common. *DZD 254, 423, 1563B; FF s.n.*

Olneya tesota A. Gray. Ironwood. N, T; occasional to common, often along washes and runnels. *DZD 661, 898.*

Parkinsonia florida (Benth. ex A. Gray) S. Watson [*Cercidium floridum* Benth. ex A. Gray]. Blue Paloverde. N, T; occasional along major washes. *DZD 768, 2097.*

Parkinsonia microphylla Torr. [*Cercidium microphyllum* (Torr.) Rose & I.M. Johnst.]. Foothills Paloverde, Littleleaf Paloverde. N, T; occasional to common. *DZD 557.*

Prosopis velutina Wooton. [*Prosopis juliflora* (Sw.) DC. var. *velutina* (Woot.) Sarg.]. Velvet Mesquite. N, T; occasional along major washes. *DZD 665.*

Senna covesii (A. Gray) H.S. Irwin & Barneby. [*Cassia covesii* A. Gray]. Hairy Senna. N, SH; occasional. *DZD 2040, 2407.*

Fouquieriaceae

Fouquieria splendens Engelm. Ocotillo. N, SH; occasional to common. *DZD 398.*

Geraniaceae

Erodium cicutarium (L.) L'Hér. ex Aiton. Filaree. I, WSE; common. *DZD 247, 376.*

Erodium texanum A. Gray. Texas Stork's Bill. N, WSE; occasional. *DZD 277.*

Hydrophyllaceae

Eucrypta chrysanthemifolia (Benth.) Greene var. *bipinnatifida* (Torr.) Constance. Torrey Eucrypta. N, WSE; occasional to locally common, usually in washes. *DZD 243, 384, 1877B.*

Eucrypta micrantha (Torr.) A. Heller. Small-Flowered Eucrypta. N, WSE; rare in shallow, gravelly wash. *DZD 1569B.*

Nama hispidum A. Gray. Bristly Nama. N, WSE; rare. *DZD 416; FF s.n.*

Phacelia crenulata Torr. ex S. Watson var. *ambigua* (M.E. Jones) J.F. Macbr. [*Phacelia ambigua* M.E. Jones]. Notch-Leaf Phacelia. N, WSE; occasional. *DZD 315, 385.*

Phacelia distans Benth. Wild-heliotrope. N, WSE; occasional to locally common in drainages. *DZD 250, 283, 387.*

Pholistoma auritum (Lindl.) Lilja var. *arizonicum* (M.E. Jones) Constance. Arizona Fiestaflower, Sticky Waterleaf. N, WSE; occasional to locally common along drainages. *DZD 1266B, 1570B.*

Krameriaceae

Krameria grayi Rose & J.H. Painter. White Ratany. N, SH; occasional to locally common. *DZD 506, 571.*

Lamiaceae

Hyptis emoryi Torr. Desert Lavender. N, SH; occasional to common, especially on rocky outcrops or bouldery washes. *DZD 276; JH s.n.*

Salvia columbariae Benth. var. *columbariae.* Chia. N, WSE; occasional to common in sandy washes. *DZD 282, 406, 460.*

Loasaceae

Mentzelia affinis Greene. Yellow Comet. N, WSE; rare to occasional. *DZD 296.*

Mentzelia involucrata S. Watson. Whitebraet Blazingstar. N, WSE: occasional to locally common. *DZD 570, 604.*

Malpighiaceae

Janusia gracilis A. Gray. Slender Janusia. N, SH (woody vine); occasional. *DZD 609; MM 9.*

Malvaceae

Abutilon incanum (Link) Sweet. Pelotazo. N, SH; rare. *DZD 1685B.*

Horsfordia newberryi (S. Watson) A. Gray. Yellow Felt Plant. N, SH; rare to occasional, in drainages. *DZD 972.*

Malva parviflora L. Cheeseweed. I, WSE; occasional. *DZD 413.*

Sphaeralcea ambigua A. Gray. Desert Mallow, Apricot Mallow. N, SH; occasional to locally common. *DZD316, 411, 1035.*

Sphaeralcea coulteri (S. Watson) A. Gray. Coulter's Mallow. N, WSE; rare to locally occasional. *DZD 1835B.*

Sphaeralcea emoryi Torr. ex A. Gray. Emory's Mallow. N, SH; occasional in washes and sandy areas. *DZD 1856B.*

Nyctaginaceae

Acleisanthes longiflora A. Gray. Angel Trumpet. N, SH; rare, high north-facing slopes. *DZD 1687B.*

Allionia incarnata L. Trailing Four-O'Clock, Trailing Windmills. N, P; occasional along sandy areas. *DZD 605, 974.*

Boerhavia intermedia M.E. Jones. Five-Winged Ringstem. N, SFE; common. *DZD 976, 2416, 2467, 2471, 2474, 2529.*

Boerhavia wrightii A. Gray. Largebract Spiderling. N, SFE; occasional to locally common. *DZD 977, 2528; AM 141.*

Mirabilis bigelovii A. Gray var. *bigelovii.* Desert Four-O'Clock. N, P; occasional. *DZD 288.*

Oleaceae

Menodora scabra A. Gray. [*Menodora scoparia* Engelm. ex A. Gray]. Rough Menodora. N, SH; rare to locally occasional. *DZD 762, 2411.*

Onagraceae

Camissonia boothii (Douglas ex Lehm.) P.H. Raven. Booth's Evening-Primrose. N, WSE; locally occasional. *DZD 1577B.*

Camissonia californica (Nutt. ex Torr. & A. Gray) P.H. Raven. [*Oenothera leptocarpa* Greene]. Sundrops. N, WSE; occasional to locally common. *DZD 294, 404, 1816B.*

Camissonia chamaenerioides (A. Gray) P.H. Raven. [*Oenothera chamaenerioides* A. Gray]. Longcapsule Suncup. N, WSE; occasional. *DZD 389, 410, 1606B.*

Camissonia claviformis (Torr. & Frém.) P.H. Raven ssp. *peeblesii* (Munz) P.H. Raven. [*Oenothera claviformis* Torr. & Frém. var. *peeblesii* Munz]. Browneyes. N, WSE; occasional along washes and drainages. *DZD 486, 1565B, 1621B.*

Oenothera primiveris A. Gray ssp. *primiveris.* Desert Evening-Primrose. N, WSE; locally occasional. *DZD 280, 1574B.*

Orobanchaceae

Orobanche cooperi (A. Gray) A. Heller ssp. *cooperi.* [*Orobanche ludoviciana* Nutt. var. *cooperi* (A. Gray) Beck]. Desert Broomrape. N, P (parasite); rare to locally occasional. *DZD 1682B, 1695B.*

Papaveraceae

Argemone gracilenta Greene. Prickly Poppy, Chicalote. N, P; occasional near sandy roadsides. *DZD 412, 1268B.*

Eschscholzia californica Cham. ssp. *mexicana* (Greene) C. Clark. [*Eschscholzia mexicana* Greene]. Mexican Golden Poppy. N, WSE; common. *DZD 245, 445.*

Eschscholzia minutiflora S. Watson. Pygmy Golden Poppy. N, WSE; occasional. *DZD 479, 564, 1608B.*

Pedaliaceae

Proboscidea althaeifolia (Benth.) Decne. [*Proboscidea arenaria* Engelm.]. Golden Devil'sclaw. N, P; rare in sandy areas. *DZD 1731B.*

Plantaginaceae

Plantago ovata Forssk. [*Plantago insularis* Eastw.]. Desert Indianwheat. N, WSE; occasional to common. *DZD 241, 579A, s.n.*

Plantago patagonica Jacq. [*Plantago purshii* Roem. & Schult.]. Woolly Plantain. N, WSE; occasional to common. *DZD 253, 393.*

Polemoniaceae

Eriastrum diffusum (A. Gray) H. Mason. Miniature Woollystar. N, WSE; common. *DZD 289, 402, 441, 466, 481, 561.*

Gilia flavocincta A. Nelson ssp. *flavocincta.* Lesser Yellowthroat Gilia. N, WSE; occasional to common. *DZD 446, 493, 1610B.*

Gilia stellata A. Heller. Star Gilia. N, WSE; occasional in washes. *DZD 418, 424, 1609B.*

Linanthus aureus (Nutt.) Greene. Golden Linanthus. N, WSE; locally occasional. *DZD 478.*

Linanthus bigelovii (A. Gray) Greene. Bigelow's Linanthus. N, WSE; occasional in washes. *DZD 470, 1627B.*

Linanthus demissus (A. Gray) Greene. Desertsnow. N, WSE; occasional to locally common in washes. *DZD 248, 417, 443, 464.*

Polygonaceae

Chorizanthe brevicornu Torr. var. *brevicornu.* Brittle Spineflower. N, WSE; occasional. *DZD 320, 396.*

Chorizanthe rigida (Torr.) Torr. & A. Gray. Rigid Spinyherb. N, WSE; occasional on flats or desert pavement. *DZD 395, 440.*

Eriogonum deflexum Torr. Flatcrown Buckwheat, Skeleton-Weed. N, SFE; common. *DZD 576, 766, 902, 1011, 1034, 2517.*

Eriogonum fasciculatum Benth. var. *polifolium* (Benth.) Torr. & A. Gray. Eastern Mojave Buckwheat, Flat-Topped Buckwheatbrush. N, SH; locally occasional. *DZD 501, 1879B.*

Eriogonum inflatum Torr. & Frém. Desert Trumpet. N, P; occasional. *DZD 617, 764, 1369B.*

Eriogonum trichopes Torr. Little Desert Trumpet. N, SFE; occasional to locally common on disturbed, sandy soils. *DZD 468, 900.*

Eriogonum wrightii Torr. ex Benth. Wright's Buckwheat. N, SH; rare, on upper slopes. *DZD 1686B.*
Pterostegia drymarioides Fisch. & C.A. Mey. Threadstem. N, WSE; rare. *DZD 1617B.*

Portulacaceae

Calandrinia ciliata (Ruiz & Pav.) DC. Redmaids. N, WSE; locally occasional. *DZD 1566B.*
Cistanthe monandra (Nutt.) Hershk. [*Calyptridium monandrum* Nutt.]. N, WSE; rare, in washes. *DZD 1607B.*

Ranunculaceae

Delphinium parishii A. Gray. Desert Larkspur. N, P; rare. *DZD 499.*

Resedaceae

Oligomeris linifolia (Vahl) J.F. Macbr. Linear-Leaved Cambess. N, WSE; occasional on desert pavement. *DZD 1564B, 1679BB.*

Rhamnaceae

Colubrina californica I.M. Johnst. Las Animas Nakedwood, California Snakebush. N, SH; occasional in major washes. *DZD 664, 769, 2045.*
Ziziphus obtusifolia (Hook. ex Torr. & A. Gray) A. Gray ssp. *canescens* (A. Gray) M.C. Johnst. [*Condalia lycoides* (A. Gray) Weberb. var. *canescens* (A. Gray) Trel.]. Graythorn. N, SH; rare. *DZD 899.*

Rubiaceae

Galium stellatum Kellogg ssp. *eremicum* (Hilend & J.T. Howell) Ehrend. Starry Bedstraw. N, SH; occasional in rocky drainages or washes. *DZD 616.*

Solanaceae

Datura discolor Bernh. Desert Thorn-Apple. N, P; rare. *DZD 2513.*
Lycium andersonii A.Gray. Wolfberry. N, SH; occasional. *DZD 2555.*
Lycium berlandieri Dunal. Berlandier's Wolfberry. N, SH; occasional to common. *DZD 973, 983, 1270B, 2127, 2408.*
Lycium exsertum A. Gray. Wolfberry. N, SH; occasional to common. *DZD 495, 1265B, 1269B.*
Lycium fremontii A. Gray. Fremont's Wolfberry. N, SH; occasional. *DZD 299.*
Nicotiana obtusifolia M. Martens & Galeotti var. *obtusifolia.* [*Nicotiana trigonophylla* Dunal]. Desert Tobacco. N, SFE (sporadic); occasional. *DZD 578, 2036.*
Physalis hederifolia A. Gray. Ivyleaf Groundcherry. N, P; rare, in washes. *DZD1955B.*
Solanum elaeagnifolium Cav. Silver Nightshade. N, P; occasional in disturbed areas. *DZD 2464.*

Sterculiaceae

Ayenia filiformis S. Watson. Trans Pecos Ayenia. N, SH; rare to occasional in washes. *DZD 2479.*

Ulmaceae

Celtis pallida Torr. Desert Hackberry. N, T; occasional, especially along washes. *DZD 770.*

Urticaceae

Parietaria hespera Hinton var. *hespera.* Pellitory. N, WSE; occasional. *DZD 309, 1881B; DJP 2419.*

Verbenaceae

Aloysia wrightii (A. Gray) A. Heller. Oreganillo. N, SH; rare, on rocky, north-facing drainages. *DZD 1692B.*

Viscaceae

Phoradendron californicum Nutt. Desert Mistletoe, Mesquite Mistletoe. N, P (parasite); occasional to common on Leguminous trees. *DZD 1038.*

Zygophyllaceae

Fagonia laevis Standl. [*Fagonia californica* Benth. ssp. *laevis* (Standl.) Wiggins]. California Fagonbush. N, SH; occasional. *DZD 293, 573, 765, 2035; FF s.n.*

Kallstroemia californica (S. Watson) Vail. California Caltrop. N, SFE; rare to locally occasional. *DZD 2477.*

Kallstroemia parviflora Norton. Warty Caltrop. N, SFE; rare. *DZD 2478.*

Larrea tridentata (Sessé & Moc. ex DC.) Coville. Creosote Bush. N, SH; common. *DZD 300, 2037; MM 5.*

Tribulus terrestris L. Goatheads. I, SFE; rare. *DZD 2470.*

MAGNOLIOPHYTA (ANGIOSPERMS)

LILIOPSIDA (MONOCOTYLEDONS)

Liliaceae

Dichelostemma capitatum (Benth.) Wood. [*Dichelostemma pulchellum* (Salisb.) A. Heller]. Bluedicks. N, P; occasional to locally common. *DZD 257, 1875B.*

Poaceae

Aristida adscensionis L. Sixweeks Threeawn. N, SFE (sporadic); occasional. *DZD 2482A.*

Aristida purpurea Nutt. var. *nealleyi* (Vasey) K.W. Allred. [*Aristida glauca* Steud.]. Blue Threeawn. N, P; occasional in drainages. *DZD 2482B.*

Aristida purpurea Nutt. var. *purpurea.* Purple Threeawn. N, P; occasional in drainages. *DZD 306.*

Avena sativa L. Common Oat. I, WSE; rare to locally occasional beside roads or horse trails. *DZD 577.*

Bouteloua aristidoides (HBK) Griseb. Needle Grama. N, SFE; locally occasional. *DZD 2521, 2533.*

Bouteloua barbata Lag. Sixweeks Grama. N, SFE; rare to locally occasional. *DZD 2522.*

Bromus arizonicus (Shear) Stebbins. Arizona Brome. N, WSE; occasional. *DZD 274, 490, 1626B.*

Bromus rubens L. Red Brome. I, WSE; occasional to locally common. *DZD 301, 380; FF s.n.*

Cynodon dactylon (L.) Pers. Bermuda Grass. I, P; ocally occasional. *DZD 2466.*

Dasyochloa pulchella (HBK) Willd. ex Rydb. [*Erioneuron pulchellum* (HBK) Tateoka, *Tridens pulchellus* (HBK) Hitchc.]. Fluffgrass. N, P; occasional to locally common. *DZD 1032.*

Echinochloa colona (L.) Link. Junglerice. I, WSE; rare in drainages. *DZD 2468.*

Hordeum murinum L. ssp. *glaucum* (Steud.) Tzvelev. [*Hordeum glaucum* Steud.]. Smooth Barley. I, WSE; occasional. *DZD 304, 489.*

Leptochloa panicea (de Retz.) Ohwi ssp. *brachiata* (Steud.) N. Snow. [*Leptochloa filiformis* (Lam.) Beauv.]. Mucronate Sprangletop. N, SFE; rare. *DZD 2465.*

Muhlenbergia microsperma (DC.) Trin. Littleseed Muhly. N, WSE; rare to locally occasional. *DZD 600, 614.*

Muhlenbergia porteri Scribn. ex Beal. Bush Muhly. N, P; occasional. *DZD 1036.*

Panicum miliaceum L. Broomcorn Millet. I, SFE; rare. *DZD 2541.*

Pennisetum ciliare (L.) Link. [*Cenchrus ciliaris* L.]. Buffelgrass. I, P; occasional. *DZD 386.*

Phalaris minor de Retz. Littleseed Canarygrass. I, WSE; occasional. *DZD 308, 394.*

Pleuraphis rigida Thurb. [*Hilaria rigida* (Thurb.) Benth. ex Scribn.]. Big Galleta. N, P; rare. *DZD 2519.*

Poa bigelovii Vasey & Scribn. Bigelow's Bluegrass. N, WSE; occasional to locally common. *DZD 305, 1625B; DJP 2418.*
Schimus arabicus Nees. Arabian Schismus. I, WSE; common. *DZD 377.*
Schimus barbatus (Loefl. ex L.) Thell. Mediterranean Schismus. I, WSE; occasional. *DZD 381.*
Sorghum bicolor (L.) Moench. Sorghum. I, SFE; rare. *DZD 2450.*
Tridens muticus (Torr.) Nash. Slim Tridens. N, P; rare, on higher north-facing slopes. *DZD 763.*
Urochloa arizonica (Scribn. & Merr.) Morrone & Zuloaga. [*Brachiaria arizonica* (Scribn. & Merr.) S.T. Blake, *Panicum arizonicum* Scribn. & Merr.]. Arizona Signalgrass. N, SFE; locally occasional. *DZD 2547.*
Vulpia octoflora (Walter) Rydb. [*Festuca octoflora* Walter]. Sixweeks Fescue. N, WSE; common. *DZD 311.*

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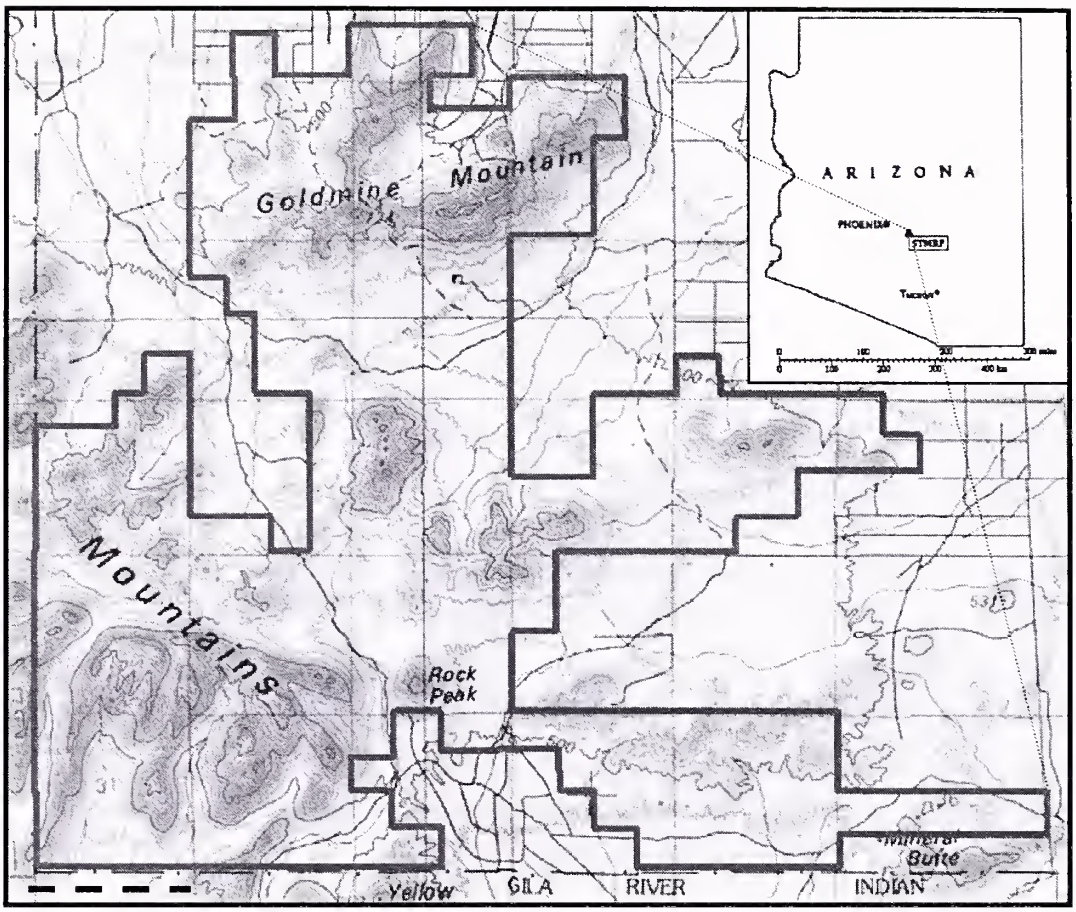

Vascular Flora of San Tan Mountains Figure 1. Map showing area covered by San Tan Mountains Regional Park (STMRP), Pinal County. Inset map (upper right) shows location of STMRP within Arizona. Scale bar (lower left) = 1 mile.

Vascular Flora of San Tan Mountains Figure 2. (A) Rhyolite Bush or Desert Mock Orange (*Crossosoma bigelovii*) is found growing on sheer recesses on the north face of the Malpais Hills; (B) Emory's Mallow (*Sphaeralcea emoryi*) is occasionally seen scattered along washes and sandy drainages in the 'south finger' of the park; (C) Looking southward from atop the Malpais Hills - Sacaton Mountains are in the distance; (D) Resurrection Fern (*Selaginella arizonica*) and winter-spring ephemerals carpet an east-facing slope, a typical response to a wet El Niño winter; (E) Foreground shrubs, *Hymenoclea salsola* var. *pentalepis*, grow primarily along sandy washes and roadsides. The wash pictured here, called "The Gap," was part of an old stagecoach road near Rock Peak; (F) Foothills Paloverde trees (*Parkinsonia microphylla*) put on a display of dazzling yellow flowers (May, 2003). This image shows typical Arizona Upland Sonoran Desertscrub with Creosote and Triangle-Leaf Bursage (*Larrea tridentata* and *Ambrosia deltoidea*, respectively) in the foreground and Saguaro (*Carnegiea gigantea*) in the background.

Vascular Flora of San Tan Mountains Figure 3. (A) Cobble clusters (rock pile fields) scattered along the ground are considered a typical feature of Hohokam agricultural sites - chollas, yuccas or agaves are thought to have been cultivated there; (B) The low alluvial fans south of Goldmine Mountain have areas dominated by Creosote Bush (*Larrea tridentata*) and Triangle-Leaf Bursage (*Ambrosia deltoidea*); (C) North-facing hillside slopes, burned in 1994, are now colonized almost exclusively by Brittlebush (*Encelia farinosa*); (D) Charred stumps of cacti, trees and shrubs give an indication of pre-fire vegetation; (E-F) Dramatic, sheer walls of the Malpais Hills.

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